ADVANTEST

ADVANTEST CORPORATION

R3273 OPT16/17

External Mixer

Operation Manual

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Safety Summary

To ensure thorough understanding of all functions and to ensure efficient use of this instrument, please read the manual carefully before using. Note that Advantest bears absolutely no responsibility for the result of operations caused due to incorrect or inappropriate use of this instrument.

If the equipment is used in a manner not specified by Advantest, the protection provided by the equipment may be impaired.

- **Warning Labels**

  Warning labels are applied to Advantest products in locations where specific dangers exist. Pay careful attention to these labels during handling. Do not remove or tear these labels. If you have any questions regarding warning labels, please ask your nearest Advantest dealer. Our address and phone number are listed at the end of this manual.

  Symbols of those warning labels are shown below together with their meaning.

  DANGER: Indicates an imminently hazardous situation which will result in death or serious personal injury.

  WARNING: Indicates a potentially hazardous situation which will result in death or serious personal injury.

  CAUTION: Indicates a potentially hazardous situation which will result in personal injury or a damage to property including the product.

- **Basic Precautions**

  Please observe the following precautions to prevent fire, burn, electric shock, and personal injury.

  - Use a power cable rated for the voltage in question. Be sure however to use a power cable conforming to safety standards of your nation when using a product overseas.
  - When inserting the plug into the electrical outlet, first turn the power switch OFF and then insert the plug as far as it will go.
  - When removing the plug from the electrical outlet, first turn the power switch OFF and then pull it out by gripping the plug. Do not pull on the power cable itself. Make sure your hands are dry at this time.
  - Before turning on the power, be sure to check that the supply voltage matches the voltage requirements of the instrument.
  - Be sure to plug the power cable into an electrical outlet which has a safety ground terminal. Grounding will be defeated if you use an extension cord which does not include a safety ground terminal.
  - Be sure to use fuses rated for the voltage in question.
  - Do not use this instrument with the case open.
  - Do not place objects on top of this product. Also, do not place flower pots or other containers containing liquid such as chemicals near this product.

- When the product has ventilation outlets, do not stick or drop metal or easily flammable objects into the ventilation outlets.
- When using the product on a cart, fix it with belts to avoid its drop.
- When connecting the product to peripheral equipment, turn the power off.

- **Caution Symbols Used Within this Manual**

Symbols indicating items requiring caution which are used in this manual are shown below together with their meaning.

DANGER: Indicates an item where there is a danger of serious personal injury (death or serious injury).

WARNING: Indicates an item relating to personal safety or health.

CAUTION: Indicates an item relating to possible damage to the product or instrument or relating to a restriction on operation.

- **Safety Marks on the Product**

The following safety marks can be found on Advantest products.

: ATTENTION - Refer to manual.

: Protective ground (earth) terminal.

: DANGER - High voltage.

: CAUTION - Risk of electric shock.

- **Replacing Parts with Limited Life**

The following parts used in the instrument are main parts with limited life.
Replace the parts listed below before their expected lifespan has expired to maintain the performance and function of the instrument.
Note that the estimated lifespan for the parts listed below may be shortened by factors such as the environment where the instrument is stored or used, and how often the instrument is used.
The parts inside are not user-replaceable. For a part replacement, please contact the Advantest sales office for servicing.

There is a possibility that each product uses different parts with limited life. For more information, refer to Chapter 1.

Main Parts with Limited Life

Part name	Life
Unit power supply	5 years
Fan motor	5 years
Electrolytic capacitor	5 years
LCD display	6 years
LCD backlight	2.5 years
Floppy disk drive	5 years
Memory backup battery	5 years

- **Hard Disk Mounted Products**

The operational warnings are listed below.

- Do not move, shock and vibrate the product while the power is turned on.
  Reading or writing data in the hard disk unit is performed with the memory disk turning at a high speed. It is a very delicate process.

- Store and operate the products under the following environmental conditions.
  An area with no sudden temperature changes.
  An area away from shock or vibrations.
  An area free from moisture, dirt, or dust.
  An area away from magnets or an instrument which generates a magnetic field.

- Make back-ups of important data.
  The data stored in the disk may become damaged if the product is mishandled. The hard disc has a limited life span which depends on the operational conditions. Note that there is no guarantee for any loss of data.

- **Precautions when Disposing of this Instrument**

When disposing of harmful substances, be sure dispose of them properly with abiding by the state-provided law.

Harmful substances: (1) PCB (polycarbon biphenyl)
(2) Mercury
(3) Ni-Cd (nickel cadmium)
(4) Other
Items possessing cyan, organic phosphorous and hexadic chromium and items which may leak cadmium or arsenic (excluding lead in sol der).

Example: fluorescent tubes, batteries

Environmental Conditions

This instrument should be only be used in an area which satisfies the following conditions:

- An area free from corrosive gas
- An area away from direct sunlight
- A dust-free area
- An area free from vibrations

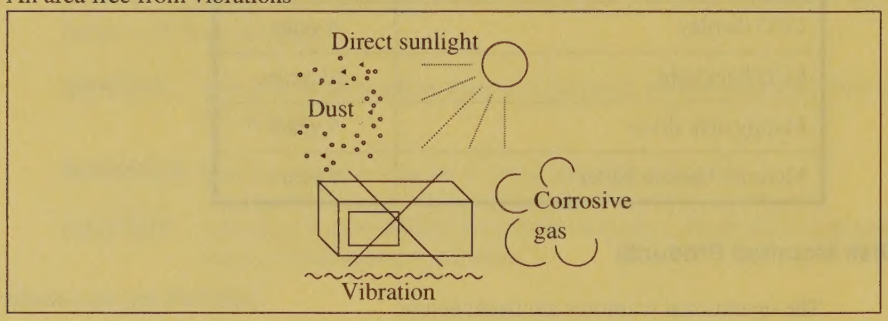

Figure-1 Environmental Conditions

- Operating position

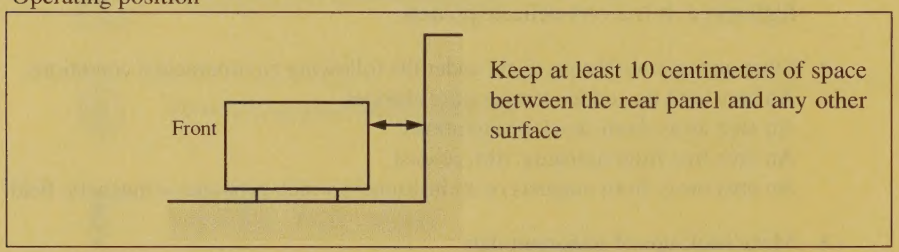

Figure-2 Operating Position

- Storage position

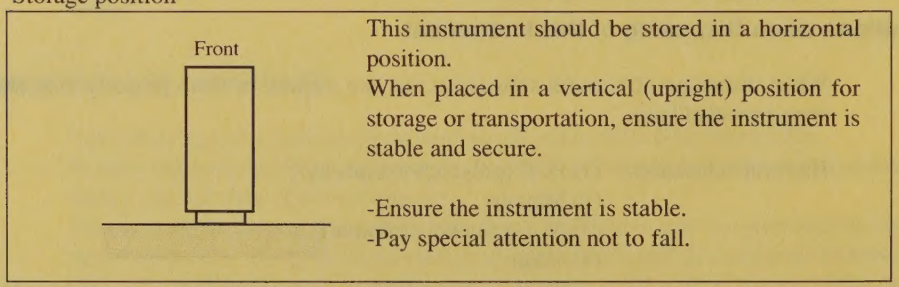
Front
This instrument should be stored in a horizontal position.
When placed in a vertical (upright) position for storage or transportation, ensure the instrument is stable and secure.
-Ensure the instrument is stable.
-Pay special attention not to fall.

Figure-3 Storage Position

This instrument can be used safely under the following conditions:

- Altitude of up to 2000 m
- Installation Categories II
- Pollution Degree 2

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1 INTRODUCTION

1.1 Product Description

Options WHMB-28S (OPT16) and WM780U (OPT17) for the R3273 are designed to analyze frequencies using an external waveguide mixer. Input signal specifications shown below are based on the capability of analyzing frequencies by the R3273.

Item	WHMB-28S(OPT16)	WM780U(OPT17)
Frequency Range	26.5 GHz to 40 GHz	40 GHz to 60 GHz
Mixing Degree (N)	6 -	8 -
Maximum Input Level	0 dBm	0 dBm

This option includes a floppy disk that contains the data on level compensation and an optimum bias current. The level compensation and optimum bias current values are automatically set by reading the data on the floppy disk into the R3273.

1.2 Components of the Options

The options OPT16 and OPT 17consist of the following components.

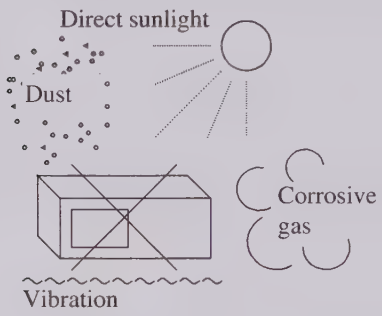
Name	Model Number	Quantity	Remarks
Waveguide mixer	WHMB-28S or WM780U	1	For OPT16:WHMB-28S For OPT17:WM780U
Cable	A01002	1	SMA cable
Floppy Disk		1	

1.3 Environmental Conditions

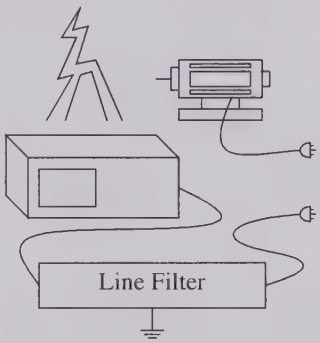
The analyzer should be only be used in an area which satisfies the following conditions:

- Ambient temperature: 0°C to +50°C (operating temperature)
- Relative humidity: 85% or less (without condensation)
- An area free from corrosive gas
- An area away from direct sunlight
- A dust-free area
- An area free from vibrations

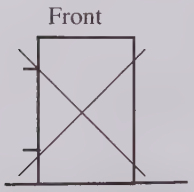
- A low noise area
  Although the analyzer has been designed to withstand a certain amount of noise riding on the AC power line, it should be used in an area of low noise. Use a noise cut filter when ambient noise is unavoidable.
- An area allowing unobstructed air flow
  There is an exhaust cooling fan on the rear panel and exhaust vents on both sides and the bottom (toward the front) of the analyzer. Never block the fan and these vents.
  Keep the rear panel 10 centimeters away from the wall. In addition, do not use the analyzer upright turned the rear panel side down. The resulting internal temperature rise will affect measurement accuracy.



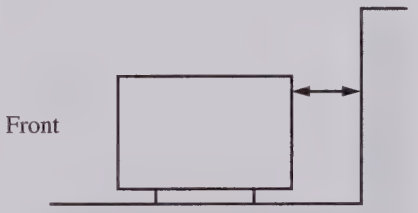
- Avoid operation in the following areas.



- Use a noise cut filter when there is a large amount of noise riding on the power line.



- Do not use the analyzer upright turned the rear panel side down.



- Keep the rear panel 10 centimeters away from the wall

Figure 1-1 Operating Environment

The R3273 can be used safely under the following conditions:

- Altitude of up to 2000 m
- Installation Categories II
- Pollution Degree 2

1.4 Cautions on Using the R3273

(1) To connect the R3273 to the waveguide mixer, proceed as follows, because the mixer diode in the waveguide mixer may be damaged due to piezoelectricity generated within this cable: first, connect the cable to the **EXT MIXER** connector on the R3273, and then connect the other end of the cable to the waveguide mixer.

(2) The maximum input signal level that can be applied to the waveguide mixer is +15 dBm. Use an attenuator, when the input signal exceeds this limit.

2 OPERATION

In this chapter, the procedures for the following are described: connecting the cable between the R3273 and the waveguide mixer, the operating method and using the signal identification function.

2.1 Connecting the Cable

NOTE: ***First, connect the cable to the EXT MIXER connector on the R3273, and then connect the other end of the cable to the waveguide mixer.***

1. Turn the R3273 **POWER** switch off.
2. Connect the cable to the **EXT MIXER** connector on the R3273.
3. Connect the other end of the cable to the **Lo** input connector on the waveguide mixer.
4. Insert the floppy disk into the drive.

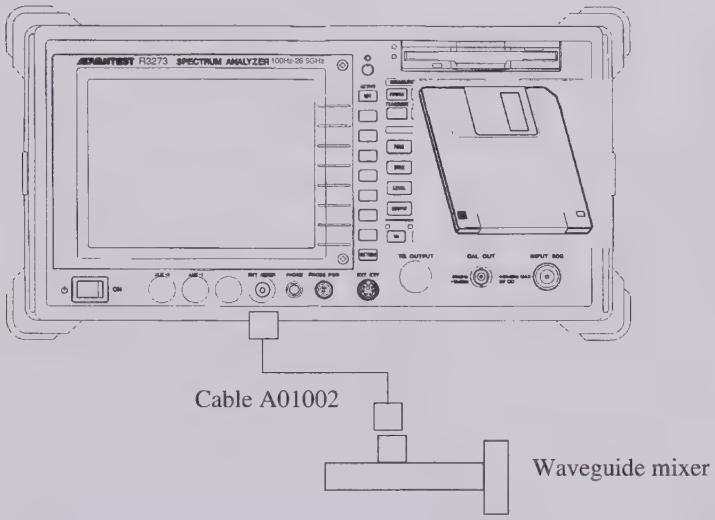


Figure 2-1 Cable Connection between the R3273 and Waveguide Mixer

2.2 Operating Method

(1) Loading data from the floppy disk (setting the external mixer mode)

The data on the floppy disk consists of the external mixer name (the file name) and frequency range (the title name) that are used in the factory.

When the data on the floppy disk is read, the mode is set to the external mixer mode, and the compensation data is read as well.

1. Turn the R3273 **POWER** switch on.
2. Press **RCL**, ***Device RAM/FD*** (FD) and ***Racall File***.
3. Enter the file name.
   Enter **WHMB28** for OPT16, or **WM780U** for OPT17.
4. Press ***Recall***.

(2) Clearing data read from the floppy disk.

The data that is read from the floppy disk into the internal memory cannot be cleared even if the **POWER** switch is turned off.

To clear the data, proceed as follows.

1. Press **LEVEL**, ***Correction Factor***, ***Correction Edit*** and ***Table Init***.

(3) Switching the mode to the normal input mode

To switch the external mixer mode to the normal input mode, proceed as follows.

1. Press **SHIFT** and **PRESET**, or press **FREQ**, ***more 1/2*** and ***Mixer INT/EXT*** (INT).

(4) Switching the mode back to the external mixer mode

To switch the normal input mode to the external mixer mode, perform Step (1) shown above or manually set the following.

1. Press **FREQ**, ***more 1/2*** and ***Mixer INT/EXT*** (EXT).
2. Press ***Ext Mixer Config*** and ***Band Select*** to select a band suitable for the mixer using the data knob.
   Select ***BAND#4*** for OPT16, or ***BAND#6*** for OPT17.
3. Press ***Band Lock ON/OFF***(ON) and ***Loss:Freq ON/OFF***(ON).

2.3 Using the Signal Identification Function

When using the external mixer without a pre-selector, multiple spectrums will erroneously be displayed to an input signal because a response, such as an image multiple, is active.

The SIGNAL IDENT function in the R3273 spectrum analyzer is used to identify the true signal. The R3273 identifies the true signal for each sweep when SIGNAL IDENT function is set to ON.

When a spectrum corresponds to the true signal, the spectrum position will remain unchanged; it will be changed for each sweep when the image multiple response is active.

To turn the signal identification function on, proceed as follows.

1. Press **FREQ**, ***more 1/2*** and ***Signal Ident ON/OFF***(ON).

3 SPECIFICATIONS

3.1 OPT16

Measuring range:	26.5 GHz to 40 GHz
Waveguide:	WR-28
Flange:	UG-599/U
Frequency response:	±3 dB (Typ.)
Average noise level:	-90 dBm (Typ.)

3.2 OPT17

Measuring range:	40 GHz to 60 GHz
Waveguide:	WR-19
Flange:	UG-383/U-M
Frequency response:	±5 dB (Typ.)
Average noise level:	-90 dBm (Typ.)

IMPORTANT INFORMATION FOR ADVANTEST SOFTWARE

PLEASE READ CAREFULLY: This is an important notice for the software defined herein. Computer programs including any additions, modifications and updates thereof, operation manuals, and related materials provided by ADVANTEST (hereafter referred to as "SOFTWARE"), included in or used with hardware produced by ADVANTEST (hereafter referred to as "PRODUCTS").

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(3) You may not reverse engineer, de-compile, or disassemble, all or any part of, the SOFTWARE.

Liability

ADVANTEST shall have no liability (1) for any PRODUCT failures, which may arise out of any misuse (misuse is deemed to be use of the SOFTWARE for purposes other than it's intended use) of the SOFTWARE. (2) For any dispute between you and any third party for any reason whatsoever including, but not limited to, infringement of intellectual property rights.

LIMITED WARRANTY

1. Unless otherwise specifically agreed by Seller and Purchaser in writing, ADVANTEST will warrant to the Purchaser that during the Warranty Period this Product (other than consumables included in the Product) will be free from defects in material and workmanship and shall conform to the specifications set forth in this Operation Manual.

2. The warranty period for the Product (the "Warranty Period") will be a period of one year commencing on the delivery date of the Product.

3. If the Product is found to be defective during the Warranty Period, ADVANTEST will, at its option and in its sole and absolute discretion, either (a) repair the defective Product or part or component thereof or (b) replace the defective Product or part or component thereof, in either case at ADVANTEST's sole cost and expense.

4. This limited warranty will not apply to defects or damage to the Product or any part or component thereof resulting from any of the following:

   (a) any modifications, maintenance or repairs other than modifications, maintenance or repairs (i) performed by ADVANTEST or (ii) specifically recommended or authorized by ADVANTEST and performed in accordance with ADVANTEST's instructions;

   (b) any improper or inadequate handling, carriage or storage of the Product by the Purchaser or any third party (other than ADVANTEST or its agents);

   (c) use of the Product under operating conditions or environments different than those specified in the Operation Manual or recommended by ADVANTEST, including, without limitation, (i) instances where the Product has been subjected to physical stress or electrical voltage exceeding the permissible range and (ii) instances where the corrosion of electrical circuits or other deterioration was accelerated by exposure to corrosive gases or dusty environments;

   (d) use of the Product in connection with software, interfaces, products or parts other than software, interfaces, products or parts supplied or recommended by ADVANTEST;

   (e) the occurrence of an event of force majeure, including, without limitation, fire, explosion, geological change, storm, flood, earthquake, tidal wave, lightning or act of war; or

   (f) any negligent act or omission of the Purchaser or any third party other than ADVANTEST.

5. **EXCEPT TO THE EXTENT EXPRESSLY PROVIDED HEREIN, ADVANTEST HEREBY EXPRESSLY DISCLAIMS, AND THE PURCHASER HEREBY WAIVES, ALL WARRANTIES, WHETHER EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, (A) ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND (B) ANY WARRANTY OR REPRESENTATION AS TO THE VALIDITY, SCOPE, EFFECTIVENESS OR USEFULNESS OF ANY TECHNOLOGY OR ANY INVENTION.**

6. **THE REMEDY SET FORTH HEREIN SHALL BE THE SOLE AND EXCLUSIVE REMEDY OF THE PURCHASER FOR BREACH OF WARRANTY WITH RESPECT TO THE PRODUCT.**

7. **ADVANTEST WILL NOT HAVE ANY LIABILITY TO THE PURCHASER FOR ANY INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, LOSS OF ANTICIPATED PROFITS OR REVENUES, IN ANY AND ALL CIRCUMSTANCES, EVEN IF ADVANTEST HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES AND WHETHER ARISING OUT OF BREACH OF CONTRACT, WARRANTY, TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE), STRICT LIABILITY, INDEMNITY, CONTRIBUTION OR OTHERWISE.**

CUSTOMER SERVICE DESCRIPTION

In order to maintain safe and trouble-free operation of the Product and to prevent the incurrence of unnecessary costs and expenses, ADVANTEST recommends a regular preventive maintenance program under its maintenance agreement.

ADVANTEST's maintenance agreement provides the Purchaser on-site and off-site maintenance, parts, maintenance machinery, regular inspections, and telephone support and will last a maximum of ten years from the date the delivery of the Product. For specific details of the services provided under the maintenance agreement, please contact the nearest ADVANTEST office listed at the end of this Operation Manual or ADVANTEST's sales representatives.

Some of the components and parts of this Product have a limited operating life (such as, electrical and mechanical parts, fan motors, unit power supply, etc.). Accordingly, these components and parts will have to be replaced on a periodic basis. If the operating life of a component or part has expired and such component or part has not been replaced, there is a possibility that the Product will not perform properly. Additionally, if the operating life of a component or part has expired and continued use of such component or part damages the Product, the Product may not be repairable. Please contact the nearest ADVANTEST office listed at the end of this Operation Manual or ADVANTEST's sales representatives to determine the operating life of a specific component or part, as the operating life may vary depending on various factors such as operating condition and usage environment.

CLAIM FOR DAMAGE IN SHIPMENT TO ORIGINAL BUYER

The product should be thoroughly inspected immediately upon original delivery to buyer. All material in the container should be checked against the enclosed packing list or the instruction manual alternatively. ADVANTEST will not be responsible for shortage unless notified immediately.
If the product is damaged in any way, a claim should be filed by the buyer with carrier immediately. (To obtain a quotation to repair shipment damage, contact ADVANTEST or the local supplier.) Final claim and negotiations with the carrier must be completed by buyer.

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